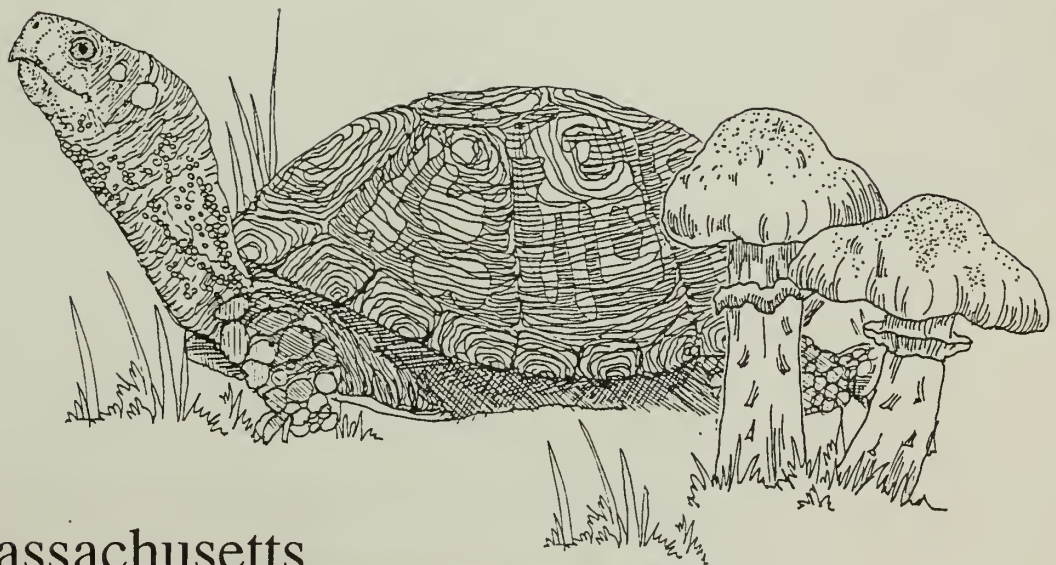


Annual Report

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THE BOARD REPORTS

George Darey
Chairman

The Massachusetts Fisheries and Wildlife Board is a group of seven persons, selected on a regional basis for their demonstrated interest in wildlife. Two members represent specific areas of expertise: wildlife biology and nongame wildlife. Each member is appointed by the Governor to a five year term. The Board oversees operations of the Division of Fisheries and Wildlife, reviews programs and sets policy and regulations pertinent to wildlife in the Commonwealth.

During this fiscal year the Board continued to hold monthly meetings at locations around the state, hold public hearings on proposed regulatory changes and address issues of specific concern. Three issues which raised particular concern among Board members were the need for a standard procedure to respond to fishkills, the growing amount of posted land in the state and the resultant impact on wildlife management, and the need for followup on the unauthorized introduction of grass carp to Massachusetts.

While these specific issues raised particular concern, most of the Board's time was spent in scrutiny and review of Division programs and proposals for regulatory changes. Among the items examined were:

Pheasant Rearing Program — In view of rising feed costs and projections of program costs increasing by \$25,000 - \$50,000 each year, the Board conducted a full review of game farm operations in the Commonwealth. A variety of options was considered in an effort to contain rising

costs of the propagation program. Concluding their deliberations, the Board members voted to close the game farm at Sandwich on an experimental basis.

Deer Management — The Board reviewed the existing deer season regulations and considered certain proposals which had been submitted to them including:

- allowing the use of rifled caplocks during the primitive firearms season (rejected)
 - allowing the use of antlers as calls (accepted)
 - changing opening day of the shotgun season (rejected)
 - changing the bag limit to two deer in zones 12, 13 and 14 (accepted)
 - prohibiting the use of permanent tree stands except with the written consent of the landowner (accepted).
- The Board also considered and approved the number of antlerless



Biological check station data indicates that despite increasing deer herd size, both deer and range are in good condition.

deer permits to be issued for the 1988 hunting season.

Bear Management — The Board reviewed the situation of black bears in the Commonwealth with special attention to complaints received about depredation by bears. As a result of these deliberations, it was determined that the two-part bear season, initi-



A radio-collared black bear is monitored by staff of the U. Mass. Coop. Wildlife Research Unit.

ated in 1982, be continued without change until after the 1988 bear hunting season.

Fuertes Prints — The Board heard and approved a fee structure and a proposed marketing plan for the sale of art prints by Louis Agassiz Fuertes.

Species for Special Consideration— Acting on the recommendation of the Nongame Advisory Committee, the Board reviewed the state list of Species for Special Consideration and added to it the blue whale and the longnosed sucker. At the same time they upgraded the roseate tern from state threatened to endangered to conform to the current federal listing.

Non-Toxic Shot — The Board reviewed information pertinent to mandating a transition from the use of lead shot to the use of non-toxic shot for the hunting of waterfowl. Federal guidelines require that this transition be made statewide no later than 1991. After review of the information available, the Board voted to require non-toxic shot in Barnstable, Essex, Nantucket and Plymouth counties for the 1987 hunting season, and to require the use of non-toxic shot statewide for the 1988 hunting season.

Personnel actions — As overseer of the operations of the Division of Fisheries and Wildlife, the Board votes confirmation of hirings, promotions, retirements and other personnel actions within the Division. During the year they presided over 25 new hires, 10 promotions and 10 retirements. Noteworthy during this fiscal year was the hiring of Jack Buckley, former Fisheries Chief of Washington D.C., as Deputy Director of Administration.

Other Activities — In the course of reviewing Division projects and programs the Board addressed numerous other issues including a review of the Division's trout production program, a review of the status of *Massachusetts Wildlife*, and a review of the North American Waterfowl Management Plan. Board members George Darey and Dr. Gwilym Jones also gave extensively of their time and energies to the Special Commission on Environmental Operations, formed as a result of the *Agenda '90, Environmental Challenge Report*.

Massachusetts Fisheries and Wildlife Board

George L. Darey, Lenox, Chairman
Nancy Begin, Topsfield, Vice Chairman
John F. Creedon, Brockton, Secretary
Colton F. Bridges, Grafton
Dr. Gwilym S. Jones, Framingham
Michael P. Roche, Orange
Raymond W. Whitaker, Winchendon

FISHERIES

Peter H. Oatis
Assistant Director, Fisheries

Survey and Inventory

A total of 48 lakes and ponds were sampled to obtain baseline data on fish populations and evaluate the effects of previous management actions. Particular emphasis was placed on evaluating the density of smelt populations. Accurate density information will permit the development of refined brown trout stocking practices and/or regulatory recommendations that will optimize trout growth.

Crews sampled 103 streams to assess existing trout populations in order to determine the impact of channelization and acidification on these streams and to refine the development of the stream classification system.

First drafts of river guides for the Swift, Ipswich and North Rivers - as well as the upper and lower Connecticut River - were completed.

Acid Rain Investigations

This marked the fifth year of the Acid Rain Monitoring Project which is conducted by volunteers trained and managed by the Massachusetts Water Resources Research Center at the University of Massachusetts. By the end of the second year the program had successfully surveyed the entire state. The team is presently in the process of sampling 800 sites that represent the full gamut of acidified and buffered waters throughout the state. This monitoring will continue for at least the next ten years and will provide a basis for statistically valid analysis of the long term trends and rate at which

Massachusetts' waters are acidifying. Since its inception this project has demonstrated the Commonwealth's vulnerability (5.5% of Massachusetts' waters are acidified, 16.7% are considered critical and 62% have very little buffering capacity). These data indicate that the recent national inventory of acidification assessment conducted by the Eastern Lakes Survey Team of the EPA grossly underestimated the threat of acidification to Massachusetts waters and may be invalid for other sections of the nation as well. Presently, information collected during the past five years is being loaded into the statewide graphic information system at the University of Massachusetts. The GIS will provide insight into long-term trends in surface water sensitivity, and the base maps produced will supply information for research and management decision making.

Whetstone Brook Project Another aspect of acid rain investigations is the Whetstone brook project, a joint federal/state undertaking designed to evaluate strategies to mitigate the effects of acidification. The collection of two years of base line data relative to the physical, chemical and biological productivity of the brook is now complete. We are presently installing a hydropowered lime dispensing station at the head of the study section. The doser is expected to begin operation during the fall of 1988. Assessments of the impact of liming this historic but recently acidified troutstream will be conducted over the next three years.

Wallum Lake Liming Wallum Lake is a beautiful, deep, infertile and acid sensitive 322 acre lake in the Douglas State Forest. Situated on the Rhode Island border, it was first limed by Massachusetts in the winter of 1971 and again in 1982 by the state of Rhode Island. Continued acidification warranted additional liming in 1987. This liming was conducted cooperatively by the Massachusetts and Rhode Island Fish and Wildlife agencies, and funded by "Living Lakes," a private research organization. Detailed physical, chemical and biological monitoring both before and at least five years after liming is incorporated into the design of this investigation.

Cooperative Aquatic Research Program Aquatic research contracted by the Division to the Water Resources Research Center at the University of Massachusetts includes an investigation into the process of mercury methylation which, when it is concluded by late 1988, should provide insight into the processes in acidifying waters that stimulate the uptake of mercury through the food chain. Another investigation to be concluded late in 1988 is concerned with identifying the pathways that mobilize aluminum, a noted fish toxicant in acidified watersheds. The Division is assisting with research to determine ways in which alkalinity may be generated from within a lake itself. Lastly, the Division has completed preliminary risk assessment for the Hoosic, Housatonic, Westfield and Millers watersheds. Findings indicate the sections of river that could become toxic to fish if existing dischargers released effluents to the maximum degree allowed during a period when river flows are at 10 year annual low flow. Such information sheds light on potential problem areas. The second phase of the project will entail verifying the results of the model with actual measurements in the field. Information from these studies may lead to establishment of

improved water quality regulations and to the re-evaluation of existing discharge permits issued by the Department of Environmental Quality Engineering.

Technical Assistance The amount of time and energy that fisheries staff members spent in providing technical advice and assistance to other agencies, review boards, advisory boards, special investigation teams and private concerns increased markedly during this year. Within the year activities included:

- monthly representation at the Pesticide Board
- representation on the Water Resource Interbasin Transfer Task Force
- participation in Hydropower Licensing Proceedings and Acid Rain Research Advisory Council meetings
- in-depth review of development and regulatory proposals encompassing projects such as pipeline crossings of streams
- lake diagnostic and feasibility study recommendations to the Division of Water Pollution Control
- commenting upon new regulations pertinent to water quality standards.

In addition, considerable field time was spent collecting specimens upon request from other agencies.

Anadromous Fish Restoration

Merrimack River Springtime fish passage operations at the Essex Dam began on May 9 and were completed on July 15, 1988. These operations successfully passed 12,359 American shad, 361,012 blueback herring and 65 Atlantic salmon. The shad figure represents a 27% decrease from the number passed during 1986. At this stage in the restoration effort it is too difficult to determine whether the low number is a reflection of a smaller shad population than in 1986 or the result of extremely low water levels coupled with mechanical problems on the fishway

early in the season. Although the former reason may be suspected on the basis that blueback herring showed a five fold increase over the numbers passed the previous year, it must be remembered that it is not uncommon for shad/herring populations to fluctuate widely from year to year and that the peak of the blueback run occurs slightly later than that of the shad.

There were mechanical difficulties at the Lowell Fishway which successfully passed 1,289 or 32% of the 3,926 shad passed in 1987. Passage of blueback herring (56,739) was a record for the species at that barrier. Consolidated Hydro, the owners of the Essex and Pawtucket fishways, will initiate studies that will lead to more effective passage of downstream migrants.

Connecticut River A total of 294,157 American shad, 343,363 blueback herring, 15,912 sea lamprey, 256 striped bass and 74 Atlantic salmon were counted at the Holyoke fishway during the 1988 spring run. Unlike the situation at the first (Essex) fishway on the Merrimack River, shad passage at this first barrier on the Connecticut River showed an increase of more than 17,000 fish compared to 1987.

Upstream fish passage for shad at the Turners Falls Dam continues to be a major concern. Only 15,787 shad — 5% of the number lifted over the Holyoke dam — successfully migrate into the Turners Falls Pool. As with the facilities on the Merrimack, the development and installation of effective downstream passage facilities for juvenile shad and salmon is crucial to the success of the program. The completion and staffing of the new U.S. Fish and Wildlife Research Laboratory charged with investigating problems unique to riverine fish populations on the eastern seaboard will hasten the resolution of some of the passage problems.

Atlantic salmon smolts growing from fry released into coldwater tributaries throughout the basin will play an important role in restoring the species. The salmon smolt production potential for tributaries in the Westfield, Manhan and Deerfield drainages are currently being evaluated. Information from this investigation will be used to develop an integrated salmon fry stocking program within the Massachusetts portion of the Connecticut Basin.

Another achievement was obtaining the inclusion of cooling towers into the design of the Indek Electrical Co. co-generation facility to be situated on the Turners Falls Power Canal. These towers will assure that canal



temperatures will be held within the tolerance of Atlantic salmon during both up- and downstream migration periods.

Atlantic Salmon smolts going into the Millers River.

Quabbin Investigations

Concern about elevated levels of mercury in lake trout prompted the issuance of a public health advisory cautioning anglers to limit their intake of lake trout. Despite the advisory issued in late August, the angling pressure does not appear to have decreased. Presently smelt, lake trout, smallmouth bass, white perch, salmon and white suckers from the reservoir are being screened for a variety of metals and organic compounds.

It appears that participation in the fishery is up slightly over the past two years. Approximately 46,700 anglers were accounted for at the boat liveries. A new state record for the lake trout was established here on May 4, 1988. Catches of lake trout, smallmouth bass and landlocked salmon were slightly higher than the previous year, while the white perch harvest increased from 7,000 to 14,000.

The threat of increased metal mobilization, particularly aluminum and nickel stemming from increased acidity, is a serious threat to the continued productivity of smelt and lake trout populations. Aluminum was mobilized during the early eighties and may have affected the survival of lake trout, lake trout eggs and fry. While the metal has not mobilized again within the past few years, additional events are expected. Because of concern over the effects of aluminum and nickel concentrations, the Division has begun to evaluate moving smelt eggs to hatching racks in the open reservoir.

Aquatic Resource Education

This new program, run primarily with volunteer effort, has continued to grow since its inception in 1985. The goal of the program is to heighten public awareness of the importance of our aquatic resources. As a result of these efforts there are presently over three thousand people who have expressed an interest in participating in the program in one form or another. To address the demands for the program, the coordinator and volunteer staff trained and certified an additional 58 instructors during the past year. There are currently 128 certified instructors capable of instructing the public on a variety of aquatic issues. The strongest tool continues to be the hosting of one-day special fishing events. Over four thousand students participated in these events during the year. One hundred twenty-six students graduated from the four day intensive fishing clinics. The program newsletter "Shortcasts" is published and sent to all volunteer instructors on a bi-monthly basis. The highlight of the year was the first Aquatic Education Volunteer Appreciation Supper.

Fisheries Staff

Peter H. Oatis,
Assistant Director, for Fisheries

Joseph Bergin Jr.
William E. Easte
Dr. David Halliwell
Mary Hamlin
Richard Keller
John Lindenberg
Robert Madore
Dr. Mark Tisa
Gary Zima

HATCHERIES

David Fredenburgh
Chief, Fish Culturist

It was a good production year for the hatcheries, which raised and prepared for release a total of 904,700 trout, salmon, northern pike and tiger muskies at a total weight of 523,900 lbs. The stocked trout were of good quality as well as large size. Over 575,000 of the stocked trout fell into the category of nine inches plus.

The Sunderland Hatchery has been scheduled for re-construction. The design calls for 40 above ground fiberglass tanks with associated piping, valves and other necessary equipment. The hatchery will use only well water. To date, a new gravel-packed well has been constructed that yields about 500 gallons per minute. An effluent treatment facility will be constructed in the tailrace area.

A request for funding has also been

made to upgrade the Sandwich facility. Major work would consist of re-building the concrete raceways, development of a partial water re-circulation system, building new hatch-house facilities and upgrading the grounds and facilities.

General maintenance was carried out at all of the facilities. Specifically completed were:

- Rejuvenation and cleaning of a gravel-packed well at the McLaughlin hatchery
- Electrical work for the automatic pump shut off at the McLaughlin hatchery
- Installation of two 2 1/2" test wells at East Sandwich.

Additional maintenance at all of the hatcheries will be completed as money becomes available.

Trout Production 1987-88

Species	< 6	6 to 9	9 plus		12 plus	Total Fish Weight
McLaughlin						
<i>Rainbow</i>			24,000	157,800	181,800	198,960
<i>Rainbow</i> (167,950)				(290)	168,240	2,660
<i>Brook</i> 30,000		2,500	103,560		136,060	52,910
<i>Brook</i> (45,000)					45,000	335
<i>Brown</i>		94,150			94,150	23,840
<i>Brown</i> (151,250)					151,250	5,325
TOTAL	30,000	96,650	127,560	157,800	412,010	275,710
(TR)	(364,200)				(364,200)	
Palmer						
					0	
<i>Land. Sal.</i> 50,000		61,750			111,750	15,365
<i>Brood Sal.</i>				345	345	865
<i>Tiger Muskie</i>		4,200	4,100		8,300	1,150
<i>Rainbow</i>			2,350		2,350	1,670
<i>N. Pike</i>			6,445		6,445	1,290
<i>At. Salmon</i>		29,400			29,400	4,200
TOTAL	50,000	95,170	12,895	345	158,410	24,540
Montague						
					0	
<i>Rainbow</i>			39,750	17,585	57,335	48,495
<i>Brook</i>			22,000	6,500	28,500	17,260
<i>Brown</i>		12,000		15,100	27,100	12,350
TOTAL		12,000	61,750	39,185	112,935	78,105
Sunderland						
					0	
<i>Rainbow</i>			46,100	11,910	58,010	52,400
<i>Brook</i>			15,300	5,620	20,920	17,245
<i>Brown</i>				19,470	19,470	19,475
TOTAL			61,400	37,000	98,400	89,120
Sandwich						
					0	
<i>Rainbow</i>			52,810		52,810	29,015
<i>Brook</i>		1,160			1,160	225
<i>Sea-run Brown</i>		14,100	725		14,825	3,735
<i>Brown</i>		30,225	23,945		54,170	23,460
TOTAL		45,485	77,480		122,965	56,435
GRAND TOT.	80,000	249,305	341,085	234,330	904,720	523,910
Transfers	364,200			290	364,490	8,320

Hatchery Staff

Bitzer Fish Hatchery

Ralph Taylor, *Manager*
Chester Kopinto
John Kopinto
John Williams

McLaughlin Fish Hatchery

James Hahn, *Manager*
Jennifer Ayre
Edward Bolduc
Annette Kucharczik
Albert Leach
John McGurn
William Mikelk
Roscoe Perham III
Joseph Skowron
John Sousa

Sandwich Fish Hatchery

Lloyd Raymond, *Manager*
Alan Aittaniemi
Antone Frenandes, Jr.
Lawrence Hollings
Arthur Leonard
Vernon Lopez
George Moore

Palmer Fish Hatchery

Michael Masley, *Manager*
Robert Lucas
Arthur Pellegrini, Jr.

Sunderland Fish Hatchery

Frank Pietryka, *Manager*
John Besse, Jr.
John Gromaski
Douglas Isles
Edward Siwicki
Thomas Smith

WILDLIFE

Wayne F. MacCallum
Assistant Director, Wildlife Research

Birds

Game and Migratory Bird Censuses

Bobwhite Quail

The 1987 weighted call indices for Barnstable, Bristol and Plymouth counties, and the statewide total, showed no significant difference from 1985 mean indices or from a five-year (1977-85) mean index (all routes combined). The 1987 weighted index for Plymouth county did show a significant decrease from the five-year index for comparable routes.

Mourning Dove

Due to manpower limitations and the limited usefulness of dove survey information, the number of dove survey routes in Massachusetts was decreased from 18 in 1985 to eight in 1986 and subsequent years. The number of calling doves on three long-term routes increased 44 percent from 1987 to 1988. Counts on eight comparable routes increased 15 percent from 1987 to 1988.

Woodcock

The Fisheries and Wildlife Board continued the three bird daily limit on woodcock which has been in force since 1985. Although woodcock have made a good recovery, the census indicates that levels are still slightly below the long-term average.

The 1988 spring census of woodcock on 12 survey routes showed that the

population was down slightly (-3.2%) from 1987. The spring was warm and dry through the peak of hatching and production was anticipated to be excellent. The breeding population index in the Eastern United States increased 2.3 percent.

Wild Turkey

The ninth Massachusetts spring gobbler hunt was held in May 1988. A total of 8,100 permits were allocated for each period of the season, of which 6,157 were received for the first period and 5,276 for the second period. Hunters provided a record kill of 557 turkeys with an overall success rate of 6.3%. The Berkshire county kill was 274 (49.2%) followed by Franklin county (125) and Hampshire county (59). Adult males comprised 270 (48.5%) of the kill.



Almost half of the 557 turkeys taken during the season were adult males or "toms."

Abundant snow cover facilitated winter trapping and Division staff succeeded in capturing 70 turkeys. Releases were made on the Phillips Sanctuary in Boxford (21, 9M:12F), Fall River-Freetown State Forest (24, 11M:13F) and near Baralock Hill in Groton (16, 5M:11F). An additional nine immature males were banded and released at the capture sites in Berkshire county.

Waterfowl

A total of 298 ducks were banded during spring, summer and fall trapping efforts. The total included 235 wood ducks, 50 mallards, 6 black ducks, 3 mallard x black hybrids, 1 blue-winged teal and 3 hooded mergansers.

The airboat, destroyed in a 1986 accident, was not replaced, but Parker River NWR, Great Meadows NWR and Division personnel combined efforts to airboat the Great Meadows NWR impoundments using the Parker River NWR airboat. A total of 56 wood ducks were banded under the Division's permit. Twenty-three mallards, 11 green-winged teal and 4 blue-winged teal were banded under the Great Meadows NWR permit.

A total of 136,025 waterfowl were counted during the January, 1988 mid-winter coastal survey. Black duck numbers were down from both 1987 (-7%) and down from the 10 year average (-11%). Only golden-eye and eider numbers were up over last year's duck count. The 1987 eider count, however, was a 25 year low, so although the 1988 eider count was 35% below the 10 year average, it was still above the 1987 figure. The 1988 Canada goose count (18,135) was the highest on record.

In addition to the aerial coastal waterfowl survey, a ground survey was made of sites where people feed waterfowl. This survey has been conducted every five years since 1973. A total of 19,511 mallards, 2,232 black ducks, 1,264 Canada geese, 33 Amer-

ican wigeon, 13 pintail, 9 wood duck, 6 green-winged teal, 36 coot and one gadwall were counted at 163 locations in 87 communities across Massachusetts during the period of January 9-24, 1988 period. The 1988 mallard count was 49% higher than in 1983, and the black duck count was up 33%.

The winter of 1987-88 began with mild conditions but January brought a series of very cold spells followed by mild periods with temperatures approaching or exceeding 50 degrees F. There were several moderate snow falls during the winter resulting in 100% snow cover at times. Division personnel and cooperators banded 386 black ducks, 97 mallard x black hybrids, 51 mallards, and a pintail.

During a five year study of nest structures, wood duck use of wooden boxes was higher than use of plastic buckets (26% vs. 12%) on 13 new areas. It was also higher in boxes on established areas (57% vs. 37%). Nest success was also higher in wooden boxes. It is more economical to use wooden boxes than plastic buckets because buckets, though cheaper to make, do not last as long as wooden boxes and require more frequent replacement.

The results of a study on biological tagging of wood ducks were presented by James E. Thul at the North American Wood Duck Symposium held in St. Louis. Thul's blood parasite tagging data were supported by band recovery data presented in a paper at the symposium by Heusmann of Massachusetts. The two studies demonstrated that Virginia is harvesting a substantial number of northern wood ducks in its early, liberal bag season in October. The prevalence of northern wood ducks in southern states in October declined markedly south of Virginia.

Wood duck production continued at high levels with 256 successful nests from 314 nest starts in 681 boxes located on 50 statewide study areas.

There were also 13 successful hooded merganser nests.

A pilot study to determine numbers of breeding mallards and black ducks was conducted during the spring of 1988. Massachusetts, Rhode Island, Connecticut, New Jersey, New York, and Pennsylvania participated. The results were encouraging and a three-year study, beginning in 1989, will involve all of the flyway states from Virginia north.

A total of 674 Canada geese were banded during pre-season drive trapping efforts on 7 sites, but only 33 geese were winter trapped and banded. A total of 312 pairs of geese were counted on 232 half mile square plots and 3 reservoir systems located in 7 regions of eastern Massachusetts as part of a nesting study. Total number of pairs in the 7 regions were estimated to be 3,562 plus or minus 30%. The total state nesting population is estimated to be 6,000 pairs. A total of 40,354 goose observations were made in a migration survey conducted between September, 1987 and February, 1988. There were observations of collars involving 48 individual birds. Collar and count data indicate migration peaked in November.

During 1988 the Division conducted an experimental late goose season. During this season 3,482 sportsmen received hunting permits. Of these, 1,793 (51%) actually hunted for geese during the period. Of these, 749 (42%) were successful in harvesting one or more geese during the late season. A total of 6,459 trips were made during the 16 day season and 2,927 geese were harvested. Fourth and fifth birds in the bag accounted for only 5.3% of the late season goose harvest. A "memory and prestige" correction factor suggests the actual harvest was probably lower.

A full report was made to the U.S. Fish and Wildlife Service on Massachusetts' five year zoning experiment. The U. S. Fish and Wildlife Service is currently evaluating the entire zoning

issue and may require suspension or modifications of zoned seasons depending on the outcome of that evaluation. Massachusetts will continue to hold zoned seasons in the interim.

Falconry

At this point the Division has licensed 11 apprentice falconers, 16 general falconers and 7 master falconers. In addition, the Division has issued 6 raptor propagation permits and 27 raptor salvage permits.

Mammals

Furbearers

Beaver — The 1987-88 beaver trapping season ran from November 15 to February 28 statewide. During this season, a total of 1,695 beaver were taken by 117 trappers in 125 towns, with a mean take of 14.5 beaver per successful trapper. This take represents an increase of 324 beaver (23.6%) over 1986-87. Harvests increased in all counties except Worcester. Berkshire, Essex and Middlesex counties increased by 70-113 percent while increases in the Connecticut River Valley counties were between 10-20 percent. The harvest in Worcester county declined 22.6%. For the first time since 1982-83, the harvest in the western region (west of the Connecticut River) exceeded that in the eastern region.

Coyote — A total of 79 coyotes were taken by 48 sportsmen in 47 towns and eight counties during the 1987-

An eastern coyote lopes away after scenting the photographer.



88 hunting season. The majority were taken in November. Nine depredation reports were received; primarily involving sheep or lambs.

Otter and Fisher — During the 1987 otter season, 76 successful trappers took 181 otter in 85 towns and 10 counties for a mean take of 2.4 otter per successful trapper. This compares with a harvest of 94 and a mean take of 1.6 in 1986. Worcester (73) Berkshire (24) Franklin (21) and Essex (20) counties yielded the most otter. Otter carcasses were turned over to the Massachusetts Cooperative Wildlife Research Unit for analysis.

The number of fisher taken increased from 201 in 1986 to 248 in 1987, with 69 successful trappers taking an average of 3.6 fisher each among 67 towns in seven counties. In 1986, 57 successful trappers took an average of 3.5 fisher each. The top counties were Worcester (130 fisher) Franklin (53) and Essex (33). A total of 240 fisher carcasses were received from cooperating trappers. The mean age of fisher in 1987 was 1.43, as compared to 1.51 in 1986. Twenty-five (81%) of 31 fisher aged 1.5 and older showed evidence of reproductive activity. Average corpora lutea counts were 2.6 in 1987, compared to 2.2 in 1986.

Bobcat — A total of 35 bobcats were taken in 1987-88, including 12 by hunting, 21 by trapping, and two road kills. The mean take by a successful hunter was 1.1 and per successful trapper was 2.0. Twelve trapped bobcats were taken in November and 10 in December, while January and February were the most successful months for hunting.

Statewide Furbuyers Tallies — A total of 26 furbearer licenses were issued. Pelts received by furbuyers were 83 opossum, 1,077 beaver, 20,059 muskrat, 121 coyote, 281 red fox, 83 gray fox, 5,857 raccoon, 85 fisher, 801 mink, 25 striped

skunk, 179 river otter and 10 bobcat pelts.

Black Bear

A total of 1,048 bear hunting permits were issued for the 1987 hunting season. A record total of 34 bear were taken during the two-week split season, including 32 during the first segment and two during the second segment. Fourteen males and 20 females were taken in Berkshire (5) Franklin (14) Hampshire (12) and Hampden (3) counties. Three road kills, two nuisance kills, and one illegal kill were recorded. A total of 39 complaints were received, primarily corn (15) and beehive (10) damage. Field studies of bear habitat use, reproductive success, and behavioral interactions continue to be conducted in conjunction with the Massachusetts Cooperative Wildlife Research Unit.

White-Tailed Deer

Division biologists were involved in research, management, and educational activities that reached many citizens of the Commonwealth and led to better understanding and control of the state's estimated 45,000 deer.

The major research effort was aimed at analyzing herd growth and conditions across the state. During the 1987 deer hunting seasons, approximately 70,000 hunters shot 5,596 deer. Division staff collected biological data on almost 40 percent of the deer taken. Yearling male antler beam diameter measurements and deer weights indicated that the increasing deer herd size has not affected the good condition of the deer and their range.

In an effort to better understand deer population dynamics, the deer project leader developed a computer-based population model. This model is currently being tested by biologists and managers throughout the Northeast. Following testing and modification, the model will be used as a management tool that will provide objective

analysis of deer populations based on harvest and age data collected during the hunting season. The Division also sponsored a fawn mortality study through the Massachusetts Cooperative Wildlife Research Unit at the University of Massachusetts.

During 1987, Environmental Police Officers submitted 905 reports of deer dying of non-hunting mortality factors. These reports help assess the need to control deer numbers in certain areas of the state. Statewide, 707 deer were killed in deer-vehicle accidents.

The basis of deer management in this state is the control of the harvest of female deer during the shotgun deer season through the antlerless permit system. Approximately 37,000 sportsmen applied for antlerless permits and the Division issued 10,333 permits in 14 deer management zones. The \$5.00 permit fee generated over \$51,000 toward costs associated with running the deer management program. Archers and primitive firearm hunters contributed another \$125,000 to Division programs through the purchase of a stamp that allows them to hunt deer during special seasons. In addition, deer hunters in this state contributed approximately \$35 million to the state's economy through purchases associated with hunting (i.e. hunting equipment, transportation, food and lodging).

Based on information gathered on land use trends, deer population indices and deer-human interaction, the Division increased the bag limit from one to two in management zones 12, 13 and 14 (Barnstable, Dukes, and Nantucket Counties). This decision will create consistent regulations across the state and will allow hunters the opportunity to harvest two deer in these three areas that are experiencing high development pressures resulting in decreased habitat and higher deer densities.



Forestry for Wildlife

Progress was made on each of the forestry program's three objectives, which are:

Carl Germain and family of Hardwick and his 206 lb. buck.

1. Build an inventory data base for each wildlife management area (WMA), and establish boundary lines in the field.
2. Use inventory data to design and carry out commercial forest cutting operations that improve wildlife habitat on, and human access into, each WMA.
3. Determine the response of wildlife populations to forest cutting operations.

Commercial forest cutting operations continued on a portion of the Hy Fox WMA in the Towns of Chester and Worthington. Gagnon Brothers Logging had been awarded the original contract through a public, competitive bid. An additional 110,000 board feet of timber and 400 cords of firewood were sold in exchange for construction equipment, material and labor used for building a major access road into this 1,000 acre portion of the Hy Fox WMA.

A contract for a second commercial forest cutting operation on another portion of the Hy Fox WMA in the Town of Chesterfield was awarded to Sarafin & Sons of Chesterfield. A total of 25,000 board feet of timber and 50 cords of firewood were sold in exchange for machinery and labor to

reclaim an old apple orchard, to obtain and plant additional wild stock apple trees in the orchard, and to conduct site preparation aimed at regenerating white pine in the commercial sale area.

A contract for a commercial forest cutting operation on the Bitzer State Fish Hatchery in Montague was awarded to Michael Zagula of Indian Orchard. A total of 95,000 board feet of timber was sold in exchange for insured machinery and labor to remove large trees threatening electric lines and buildings on the hatchery grounds, and for delivery of both rough and finished lumber for construction projects at the hatchery.

For the third consecutive year, a ruffed grouse drumming census and a breeding songbird census were conducted on a portion of the Hy Fox WMA in Chester and Worthington. These data will be used to evaluate the response of wildlife populations to the on-going forest cutting.

The forestry program continues to benefit from interaction with the Massachusetts Cooperative Wildlife Research Unit and the University of Massachusetts Department of Forestry and Wildlife. Two senior level students (a forestry major and a wildlife major) were hired by the Department through the Co-op Unit, and conducted a forest inventory on 1200 acres of the Peru WMA.

Work planned for the next fiscal year

includes finishing the forest inventory and boundary work on the Peru WMA, and initiating a commercial sale on either the Fox Den WMA, or the Peru WMA.

Statewide Development

The Statewide Development Project is charged with the operation of Wildlife Management Areas and the construction and maintenance of nesting structures.

Wildlife management area operations include actual habitat management, as well as public access work, planning and special projects such as controlled hunting.

Nesting structure work includes the erection and maintenance of wood duck nesting boxes, osprey nesting platforms and bluebird nest boxes. Loon nesting rafts are also constructed and maintained on Quabbin and Wachusett Reservoirs.

Additional research studies

A number of additional research projects were carried out during the year by staff and students of the Massachusetts Cooperative Wildlife Research Unit working in conjunction with staff of the Division of Fisheries and Wildlife. Among these were:

Harvest Survey Analysis — This study has been completed. The Division game harvest survey methodology was studied from 1985 through 1987. Sampling techniques and estimation procedures were



A fawn search is conducted in southern Berkshire County by personnel from the Univ. of Mass. and the Div. Fisheries and Wildlife.

analyzed for statistical soundness and computer simulation programs were used to demonstrate the effects of unequal probability sampling on the distributions of survey estimates. Recommendations for future surveys include continued use of telephone surveys with adjustments in sample size and estimation procedures.

Movements, Mortality, and Habitat Use of White-tailed Deer Fawns

Sixteen radio-collared fawns were monitored from June to December 1987. Mortalities, movements and habitat use were recorded. Nine uncollared fawns were also monitored for mortality by following the movements of nine collared adult does.

During the shotgun season in December, data were collected at two check stations in deer management zones 01 and 03. Weight, sex, age and various measurements were taken from 260 harvested deer. These data will be compared with identical parameters recorded in 1986, and with those from road-killed deer collected in the study area from February to April.

Winter capture of adult females netted three animals which were ear-tagged, collared and released. The males were ear-tagged only. Ground searches for fawns located 16 fawns which were captured and fitted with radio collars.

One 14-day-old female, radio-collared in 1987, died of a probable umbilicus infection. No mortalities were detected for 23 other monitored fawns in 1987. Three adult mortalities occurred.

Black Bear Behavioral Interactions and Reproductive Success — Four adult females and one adult male were monitored through fall 1987. One female was killed during the legal bear season and another illegally killed in November. Two yearlings belonging to a third female were radio-collared in the winter den. An additional 10 bears (4 males, 6 females) were captured and radio-collared between March and June 1988. Capture

efforts will continue through August. Adult bears are located at least once weekly. Yearlings and sub-adults are located and monitored at least twice weekly.

River Otter Habitat Use and Movements — Wetland areas in Worcester county were selected on the basis of size, type and proximity to human activity, and 139 locations were scouted on foot for river otter sign. The amount of sign was recorded and the area evaluated for live-trapping potential. Capture success was very low for the 1987 field season, with only one capture (animal subsequently escaped) in 2135 trap nights.

River Otter Contaminant Analysis and Population Dynamics — Contaminant data from river otters taken during the 1986 Massachusetts trapping season were received. These data were compiled and a preliminary analysis made. Comparisons were made between otter contaminant values and fish mercury and PCB data from the same watersheds.

Game Releases

On September 24, 1987, the Fisheries and Wildlife Board voted to end the rearing of pheasant and quail at the Sandwich Game Farm in a move to contain the rising costs of the game bird propagation program. The Sandwich facility will be maintained as a holding facility for quail to be purchased from private vendors. For 1989, stocking pheasant production will continue with the Ayer Game Farm at full capacity (30,000) and about 15,000 pheasants will be purchased from private vendors.

Some 240 linear feet of brooder house roof was replaced at Ayer by private contract. Staff conducted routine maintenance of buildings, pens and grounds.

Brood stock were inoculated against fowl cholera. No unusual disease problems were encountered and all production goals were met.

A total of 40,906 pheasant, 3,566 quail and 500 snowshoe hare were released immediately prior to or during the 1987 hunting season. An additional 5,258 pheasant were provided to clubs participating in the

cooperative rearing program. The pheasants were produced at the Ayer and Sandwich game farms. All quail were produced at the Sandwich game farm. The snowshoe hare were purchased from a New Brunswick vendor.

Wildlife Staff

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Assistant Director for Wildlife Research

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Richard Burrell

James E. Cardoza

Thomas Early

Marcia Hartleb

H W Heusmann

E.M. Pollack

John Scanlon

Dr. Steven Williams

Game Farm Staff

Ayer Game Farm

Stephen Foster, *Manager*

Robert Bennett

Mark Brideau

Richard Donohue

Sandwich Game Farm

John Prouty, *Manager*

Jack Almeida

Robert Gallagher

Ernest Green

Kenneth Weaver

NATURAL HERITAGE AND ENDANGERED SPECIES

Dr. Thomas W. French

Assistant Director, Natural Heritage and Endangered Species

On April 1, 1988 five Natural Heritage staff became full-time state employees. These staff members had formerly been employees of The Nature Conservancy, provided to the Division through a contract. These new state positions include:

1. Natural Heritage Coordinator - Henry Woolsey
2. State Botanist - Bruce Sorrie
3. Plant Community Ecologist - Dr. Pat Swain
4. Program Zoologist - Dr. Scott Melvin
5. Environmental Reviewer - Jay Copeland

A full time Data Manager (Meg Goodwin) and a part-time Public Lands Registry Specialist (Annie Woolsey) remain positions that are provided through a Nature Conservancy contract.

The 1986 wildlife habitat amendment to the Wetlands Protection Act and the resulting amended regulations prompted the Division to seek and obtain from the legislature in 1987 a new state-position for a Wetlands Wildlife Biologist. This position was filled on January 19th when Steve Roble joined the Section staff. The total full-time staff of the Natural Heritage & Endangered Species Section in state positions now numbers nine. The total functional staff increased by two in FY '88 and now numbers 10 full-time, one part-time and from one to four interns or work-study students.

Inventory Research and Management

Based on the best scientific data available and after consultation with the Nongame Advisory Committee, the Division added seven animal species to the official state list of Endangered, Threatened, and Special Concern Species in FY '88. The added species were: 2 fish (one previously considered extirpated), 1 whale (not previously documented in Massachusetts waters), 1 damselfly (previously considered extirpated), 1 freshwater snail and 2 freshwater crustaceans. The only other change to either of the state Endangered, Threatened, or Special Concern plant or animal lists was that the status of the Roseate Tern was upgraded to Endangered because of its listing as federally Endangered in December, 1987.

The Section continued to work on a wide variety of inventory, research, and management projects on endangered, threatened, and special concern species, as well as other components of the state's biological diversity. Major wildlife, plant, and natural community projects are listed below. Certain Small Research Contract Program-funded projects are also included below and are denoted with an asterisk.

Birds

Piping Plover - The Section continued investigations of Piping Plover (federally Threatened) population dy-

namics, habitat use, and management needs, in collaboration with Dr. Curtice Griffin, University of Massachusetts at Amherst. Research was expanded in 1988 to examine aspects of foraging ecology and impacts of off-road vehicles on this shorebird, and involved three graduate students and several technicians.



A female peregrine falcon over Springfield.

Results to date have demonstrated that predation is a much more serious factor limiting nest success than originally believed, but that nest monitoring and other research activities do not result in increased nest predation and may, in fact, have the opposite effect. Survival rates of both adult and juvenile plovers are higher than expected. Adults show moderate levels of site fidelity but may also disperse to breeding sites as far as away as Connecticut. Predator exclosures have been field tested and found to be a safe and effective means of reducing nest loss due to foxes. The Section continued to coordinate and motivate all cooperators involved in Piping Plover monitoring and management activities in Massachusetts. Management activities statewide have intensified steadily since 1984. After a significant population decline in 1987, preliminary figures for 1988 show increases in both total breeding population and productivity.

Dr. Scott Melvin co-authored, with other Recovery Team members, the Atlantic Coast Piping Plover Recovery Plan. The final version was issued in March, 1988.

Terns - Preliminary results of the June, 1988 Tern inventory show Common Terns continuing to increase with 9,538 pairs reported, up 8% from 8,869 pairs in 1987. Least Terns reached a record 2,676 pairs at 50 sites, up from 2,109 pairs a year earlier. Roseate Terns (listed as federally Endangered, December 1987) number 1,654 pairs (primarily at one island in Marion) and Arctic Terns 17 pairs at 5 sites; both species about level with 1987 results. The 1988 tern census was considerably aided and improved by a special workshop held May 26th at Cape Cod Community College.

Peregrine Falcon - From four eggs, two young Peregrine Falcons hatched on May 18, 1988 at the Customs House Tower in Boston. It was the first totally wild hatching of peregrines in Massachusetts in 42 years. A second pair of peregrines resided in Springfield but no breeding activity was documented.

Bald eagle - Our annual mid-winter survey, conducted on January 8, 1988, recorded a total of 45 Bald Eagles (federally Endangered) statewide. On February 17, 1988, "Iolar," an immature Bald Eagle found exhausted in Ireland in December 1987 and transferred to the U.S., was released at Quabbin Reservoir, attracting worldwide attention. During FY '88, eight more Nova Scotian eaglets were reared and released at the Quabbin Reservoir, bringing to 42 the total number "hacked" at Quabbin since the project's inception in 1982. In spring, 1988, two (possibly three) territorial pairs of eagles were monitored in the Quabbin Reservation. Two of these pairs have built nests. All the territorial birds are banded, and two are definitely Massachusetts-released birds. One of these, nicknamed "Ross," is from the first eagle release in 1982.

Short-eared Owl - Studies of Short-eared Owl population dynamics and habitat use continued on the is-

lands of Nantucket and Tuckernuck. Breeding populations of this ground-nesting owl have remained relatively stable during the period 1985 -1988; however, preliminary results from 1988 indicate that timing of nesting was delayed and productivity was reduced by the low prey densities recorded during the four years of the study. Precise information on distribution and habitat requirements of both Short-eared Owls and Northern Harriers generated by this study played a part in a number of land use planning and acquisition decisions affecting the maritime heathlands on both islands.

Osprey - Management activities were highlighted by the installation of 11 new nest poles in Barnstable and Bristol County. In 1987 there were 117 active nests (all coastal) in the state, producing 218 young. These figures compare very favorably with 24 active nests and 19 young in 1977; 1988 data are not yet complete.

Common Loon - Nesting activity in Massachusetts remained stable in 1988 with 9-10 territorial pairs on five waterbodies. There was record production in 1988, with nine chicks fledged. The project deployed five traditional nest rafts; one was utilized. The water level at Wachusett Reservoir was fixed in cooperation with the MDC to avoid flooding of a loon's nest there.

Grassland Birds - Studies continued at the Westover Air Force Base in Chicopee to inventory and develop management recommendations for the base's grassland bird community, as part of a 3-year study funded by the U.S. Air Force. A companion study was initiated at Fort Devens, where the state's most diverse grassland bird community occurs on the 250-acre Turner Drop Zone.

Songbirds - Responding to widespread concern about songbird declines throughout the continent, especially declines in tropical-wintering passerine populations, State Ornithologist Brad Blodget, initiated a study

at the Hy Fox Wildlife Management Area in Chester in 1984 to collect baseline population data. This study is also designed to demonstrate the impacts of the Division's forest cutting practices on nesting songbird populations. Preliminary examination of data collected in June 1988 show some 67 species identified, with red-eyed vireo and ovenbird recorded most frequently. The index involves collecting data along 14 miles of transect at some 327 "listening stations."

Eastern Bluebirds - Bluebird nesting box "demonstration trails" are now set up in all Division districts except the Western District. At the trail on the High Ridge Wildlife Management Area in Gardner, a record 10 pairs of bluebirds appeared during the spring of 1988, producing 90 eggs from which 51 young birds successfully fledged.

Mammals

Northern Right Whale - An eleven member Right Whale Advisory Group, made up of biologists, environmental lawyers, and an activist, was established within the Department of Fisheries, Wildlife & Environmental Law Enforcement in FY '88. The group advises the Department on Right Whale (federally Endangered) protection issues through Dr. Thomas French, the Assistant Director for Natural Heritage and Endangered Species. The group's most notable accomplishments to date include assistance in drafting the Department's recent report on the status of Right Whales in Massachusetts waters (submitted to the legislature as required by Resolution 12 of the Resolves of 1985) and a review of a proposed regulation to prohibit vessel operation within 500 yards of a Right Whale.

Reptiles and Amphibians

Plymouth Red-bellied Turtle - A total of 21 nests of the Plymouth Red-bellied Turtle (federally Endangered) were discovered between June 14 and

July 12, 1987 by Dr. Terry Graham of Worcester State College and his assistants under contract with the Division. Clutch size ranged from 10 to 16 individuals. The total hatch rate was 82.9%. A total of 180 hatchlings from 15 nests were transferred to eight



*Taking measurements
on a young bog turtle
in southern Berkshire
County.*

institutions and individuals for "head-starting," rearing hatchling turtles indoors over winter. On June 2, 1988, the surviving 149 "head-started" turtles (83 % survival rate) were released at eight ponds in Plymouth County.

Bog Turtle* - Inventory work continued in Berkshire County for this very habitat-specific and secretive turtle. Due to this inventory, there are now three documented populations in the state.

Blandings Turtle* - Inventory was conducted in northeastern Massachusetts for this state threatened reptile.

Eastern Spadefoot* - Inventory on outer Cape Cod documented four new occurrences of this southern toad.

Jefferson Salamander* - The Section helped fund a research project inves-

tigating the effects of acid precipitation on the reproductive success of this Special Concern mole salamander in the Connecticut River valley.

Fish

American Brook Lamprey* -

Population sampling and water chemistry testing were conducted on Cape Cod in one of the two drainages in the state in which this species occurs.

Invertebrates

Dragonflies* - For the second year the Section helped fund a project by the Cape Cod Museum of Natural History inventorying the dragonflies of southeastern Massachusetts, with particular emphasis on three rare Coastal Plain pond species.

Puritan Tiger Beetle* - An inventory of the Connecticut River for this globally rare insect was initiated, and one population was located.

Decodon Stem Borer Moth* -

Surveys were conducted in 40 wetlands in southeastern Massachusetts for this endemic insect. It was found in 11 towns.

Plants

Long's Bulrush - Bruce Sorrie, the State Botanist, relocated a population of this globally rare plant in New England for the first time in 38 years.

Variable Sedge* - Recently re-discovered in Massachusetts, this species is a candidate for possible federal listing. A research contract was awarded to a *Carex* specialist to study the genetic variability of this species.

Small Whorled Pogonia - A third population was discovered of (what was then) Massachusetts' only federally Endangered plant. All populations receive at least some protection and appear healthy.

Crested Fringed Orchis - This orchid, re-discovered in the state in 1987, was last documented in New England in 1908. The Program worked with the agency that owns the

site to ensure the active protection of this small population.

Sandplain Gerardia* - This small snapdragon, thought extinct worldwide before its re-discovery by the Program Botanist in 1980, was formally proposed in FY '88 for federal listing by the U.S. Fish & Wildlife Service. Only nine surviving populations are known to occur in the world. In Massachusetts, both populations of this annual plant suffered serious declines. A study was initiated to determine the species' reproductive biology.

Tiny-fruited Spike-rush - This sedge was discovered in the state and is only the second New England record.

Natural Communities

Pitch Pine/Scrub Oak Barrens*

- Research by Dr. William Patterson of the University of Massachusetts on the management of this fire-maintained community included selecting an area of Myles Standish State Forest for a small, experimental, controlled burn. Patterson also prepared brush-cut comparison units. He conducted intense pre-treatment vegetation sampling, and he cut fire breaks. The prescribed burn itself was postponed to the winter of 1988-89. Inventory and delineation of the occurrences of pine barrens around the state, with sampling and monitoring to establish diversity of and changes in the community, were begun. Records of the fire history of the various sites will incorporate the community descriptions with the fire research.

Sandplain Grasslands* - In conjunction with The Nature Conservancy, management of Katama Plains, one of the state's exemplary Sandplain Grasslands, proceeded with annual vegetation monitoring and prescribed burns in the fall and spring. Areas burned last year were very lush and covered with flowers this summer. The fall burn succeeded in killing pitch pine and shrubs invading the open areas. There appear to be reduced tick populations in the areas burned. A community description, incorpo-

rating the variation and diversity found in the sandplain grassland communities around the coastal plain, is being developed.

Calcareous Wetlands - Dr.

Patricia Swain, the Section's ecologist, continued an inventory of calcareous wetlands in Berkshire County, with visits to known exemplary sites for comparison and potential sites located from maps and aerial photos. A formal community description, with the variations included in the major type, is being developed. The Section assisted The Nature Conservancy's annual monitoring of one major calcareous fen that has several state listed rare plant and animal species.

Coastal Plain Pondshores* - Re-

search on this high priority natural community was continued by Richard LeBlond of the Center for Coastal Studies, with emphasis on the normal variation and diversity of floral constituents found in this community type. A fact sheet describing the characteristic vegetation, geologic and topographic properties of the pondshore habitat was prepared for use by the public.

Atlantic White Cedar Swamps* -

Inventory and definition of the types of subcommunities was undertaken by Glenn Motzkin, a graduate student at U. Mass. He will include a discussion of the variation found among sites of this often disturbed community. A fact sheet of the general community type was written to emphasize the importance of the community to the general public.

Other Projects

Data Management

Over 400 new records of endangered, threatened and special concern species were mapped and computerized in the Natural Heritage database in FY '88. In addition, 300 existing records were updated to incorporate information from more recent field work. Cumulative summaries of the Section's data bases are as follows:

"Element Tracking" (# of taxa, etc):
 Plants
 282 species (94 on official state list)
 Vertebrates
 525 species (73 on official state list)
 Invertebrates
 287 species (89 on official state list)
 Natural Communities
 20 high priority communities
 "Other"
 16 (includes heron rookeries, bat
 hibernacula, migratory shorebird
 stopover areas, etc.)

"Element Occurrence" (# of site-specific
 occurrences):
 Plants 2988
 Vertebrates 1119
 Invertebrates 230
 Natural Communities 31
 Managed Areas: 705
 (publicly owned or private conservation
 properties mapped on USGS topo-
 graphic maps)
 Source Abstracts: 905
 (bibliographic references computer-
 ized)

Environmental Review

Reviewing the environmental impact of
 development projects on rare species
 sites continues to be a major Section
 function. The Section continued to
 review projects through Army Corps of
 Engineers public notices, the State's
 MEPA process, the state Dept. of Public
 Works, the federal "A-95" review
 process, private consultants, local
 government and other miscellaneous
 reviews. The Section's project review
 workload is now about 1700 reviews a
 year.

Effective on November 1, 1987, the
 Section's rare species occurrence data
 started being used in regulation for the
 first time. The state Wetlands
 Protection Act regulations now require
 all project proponents to consult
 Section-prepared maps of rare wildlife
 habitat (includes invertebrates but not
 plants) in wetland resource areas and,
 if in an "estimated habitat," to contact
 the Section for determination of the
 actual habitat and an assessment of the
 project's impacts to the rare wildlife

habitat. The Section prepared
 Estimated Habitat Maps for 840
 occurrences of state-listed rare
 wetlands wildlife and distributed
 them to 240 town Conservation
 Commissions and DEQE offices.
 During FY '88, the Section reviewed
 248 wetlands project filings of which 66
 (or 27%) were in the actual habitat of a
 rare wildlife species (mitigating
 measures were suggested for 25 of
 these) but the Section recommended
 denying only three projects due to ad-
 verse impacts. The Section also ac-
 quired the additional responsibility of
 "certifying" vernal pools (small sea-
 sonal pools that are important breed-
 ing habitats for amphibians) for special
 protection under the Wetlands
 Protection Act. The Section developed
 and is distributing certification guide-
 lines detailing the criteria to be used,
 and the documentation needed, to im-
 plement the protection of this impor-
 tant wildlife habitat.

Nongame Wildlife Fund Promotion

Many of the following promotional
 materials were produced by Galler &
 Galler, a private advertising company,
 to help promote contributions to the
 Nongame Wildlife Fund, the Section's
 primary source of funding. The
 following list itemizes promotional and
 educational materials produced and
 distributed in FY 88, as well as other
 related activities:

1. Promotional poster with 9 color
 photos ("Five Years of Generous
 Taxpayer Support") 8,000 copies
 printed.
2. Full color N.H. & E.S. Program
 brochure - 50,000 copies printed.
 Direct mailing of Program brochure to
 all certified public accountants (CPAs)
 in the state.
3. Boston subway advertising card
 featuring a Short-eared Owl ("Why
 we're asking you to give money to an
 individual that has a summer home on
 Nantucket") - 300 copies displayed in
 subway cars in February and March.

4. Promotional advertisement featuring a Piping Plover ("Human Nature") inserted in Massachusetts C.P.A. Review's winter issue.

5. A 10-second television Public Service Announcement produced and distributed to eight TV stations (a "Thank You" spot with a Common Loon).

6. Right Whale conservation poster produced for Whale Awareness Day (May 5) - 2,000 copies printed.

7. Rare species fact sheets - continued preparation of one page fact sheets on specific rare plant and animal species. Over 150 now completed.

8. Worked on a Natural Heritage & Endangered Species Program logo, several promising designs were reviewed.

Budget Summary

Income:

Nongame Wildlife Fund, contributions from tax year 1986 - \$419,443

Federal reimbursements:
Endangered Species Act, Section 6
Plymouth Red-bellied Turtle -
\$12,000

Piping Plover -
\$ 6,400
U.S. Department of Defense -
\$ 4,700
(Grassland bird study at Westover AFB)

Appropriations:

Nongame Management (account 2315-0100) - \$361,627 appropriated from Nongame Wildlife Fund.
Natural Heritage (account 2310-0500) - \$141,000 appropriated originally from General Fund, amended in July 1988 to be charged 50% each to Nongame Wildlife Fund and Inland Fish & Game Fund.

Section Expenditures: FY '88 actual spending figures:

Nongame Management Account -
\$265,972
Natural Heritage Account -
\$132,791

Natural Heritage & Endangered Species Staff

Dr. Thomas French
*Assistant Director for Natural Heritage
and Endangered Species*

Bradford G. Blodget
William Davis
Jay Copeland
Dr. Scott Melvin
Dr. Steven Roble
Bruce Sorrie
Dr. Patricia Swain
Henry Woolsey

INFORMATION & EDUCATION

Ellie Horwitz

Chief, Information & Education

The primary function of the Information and Education Section is to serve the public by offering information about wildlife conditions, issues and opportunities in the Commonwealth. In this capacity all members of the Section responded to telephone and mail inquiries, presented informational programs to citizens groups, and prepared written copy for various print outlets. In addition, the Section issued 40 press packets comprising 147 press release items. These items were very well received, with newspapers printing an average of 326 articles a month containing information derived from these releases. In addition to issuing releases, the Section offered background information for members of the media seeking to prepare feature pieces, and set up field contacts where it was determined that these would assist in preparation of the piece. Specific attention was focused on particular issues and programs including:

- the annual deer tally
- restoration of wild turkeys
- restoration and return of Atlantic salmon
- restoration of peregrine falcons
- publication of the report by R. Keller on 30 years of Quabbin data
- Four events related to the eagle restoration program
- Release of young eagles reared at Quabbin
- Midwinter eagle census
- Release of an eagle sent to Massachusetts from Ireland
- Arrival of young eagles to be reared during the summer of 1988

- Signing of a bill to deed the Field Headquarters to the MDFW and of a resolution to honor Director Richard Cronin by naming the Field Headquarters building the Richard Cronin Building.

Annual Materials

As required by law, the Section produced and issued Abstracts of Migratory Bird Hunting Regulations for 1987 and Licenses and Abstracts of Fish and Wildlife Laws for 1988. Also produced were goose hunting permits, waterfowl hunting stamps and stamps for participants in the archery and primitive firearms seasons on deer. During this year Dan McGuinness joined the Section staff and began coordinating the preparation, production and distribution of licenses and abstracts.

Exhibits

During this period the Division put on five large, live-animal displays at the Hampden Co. Fair in Greenfield, the Eastern States Exposition in Springfield, the Topsfield Fair, the Eastern Fishing and Outdoor Exposition in Worcester, and the Springfield Sportsman's Show. These exhibits were designed, placed and manned for the run of the various exhibitions. The Division also prepared smaller, photographic exhibits for a number of smaller shows and single day special events.

Photography

The photography section provided photodocumentation of Division projects and programs throughout the year.

Copies of pictures were provided for *Massachusetts Wildlife* and for other publications promoting Massachusetts or creating a better understanding of wildlife in the Commonwealth. Special photo assignments included documentation of waterfowl studies and problems, introduction and release of bald eagles, introduction and release of peregrine falcons, selected rivers for the Massachusetts Riverways Atlas, release of the eagle sent from Ireland, and dedication of the Richard Cronin Headquarters Building. Selected photos from all of these projects and the files were reviewed and utilized for *Massachusetts Wildlife* and for a proposed wildlife calendar.

Publications

The major publication issued by the Division of Fisheries and Wildlife is *Massachusetts Wildlife*, which was first offered on a subscription basis in 1986 and completed its second year of operation in FY '88. Four 40-page, issues were published during this year. A subscription renewal campaign and related materials were developed. Promotional materials were developed

and techniques for distribution were identified and inaugurated. The transition to paid subscriptions and the associated complexities of fulfillment of subscriptions progressed very smoothly and by the end of FY 1988 the magazine had 19,212 paid subscribers. As this publication operates on a separate fund, the editors prepared an annual report for calendar 1987 and a budget for calendar 1988.

In addition to issuing *Massachusetts Wildlife* the Section updated and reissued publications including:

- A list of trout stocked waters
- Best Bets for Bass fishing
- Locations of northern pike and tiger muskies
- regulations for Wildlife Management Areas
- regulations for wildlife sanctuaries
- List of towns with restrictions on hunting
- Beavers in Massachusetts
- Wood Duck in Massachusetts
- Yellow Perch in Massachusetts

New publications included:

- An introduction to the Division of Fisheries and Wildlife
- A new brochure for the Mass. Junior Conservation Camp
- A brochure on orphaned animals (If You Care Leave Them There)
- Bird checklists for Bolton Flats and the Eugene Moran WMA
- A listing of Whom to Call When...

Uniforms

Visibility is a key issue for the Division of Fisheries and Wildlife which, although very active in restoring and improving the fauna of the Commonwealth, is rarely noticed or identified by members of the general public. In order to make staff more accessible to the public it was decided to provide some form of identification and uniform clothing to Division staff members. During FY '88 the Division purchased name badges for field personnel, long sleeve and short sleeve shirts (1 each) for all field personnel, and a computerized system

MASSACHUSETTS WILDLIFE is the major publication of the Information and Education Section, with over 19,000 paid subscribers.



was developed to keep track of sizes and clothing allotments.

As part of a move to make the field headquarters more accessible to the public, signs were made to guide visitors to appropriate offices.

Education

Activities in this area focused primarily on two programs, the Massachusetts Junior Conservation Camp and Project WILD.

During this fiscal year the Conservation Camp held its 37th session. As in the past the Division conducted pre-season publicity, and handled pre-season administration and registration of campers. During the camp season Section staff members and Division research biologists taught sessions on Pond Ecology/Fisheries Management and on Wildlife Management. Section staff also developed and administered the final examination and participated in the camp graduation.

Project WILD gained considerable momentum during this year. A cadre of 55 facilitators offered 27 workshops, eight of which were offered by the Division's program coordinator. Key among these workshops were one facilitator training session and one session held under the auspices of the Department of Education. By the end of this year Project WILD in Massachusetts had provided training to some 800 educators. Assuming a teacher/student ratio of one to 25, this provides a WILD outreach to about 20,000 youngsters per year.

During this year, Aquatic WILD came to Massachusetts and the program coordinators and steering committee developed policy and procedures for the distribution of Aquatic WILD materials. Many facilitators were introduced to Aquatic WILD at the annual facilitator's gathering which offers a refresher and advanced program on WILD related projects. Aquatic WILD was also featured in a copy of the WILD newsletter which was issued to three times during the year and sent

to all past workshop participants.

Adjunct materials, developed during FY '87, became available this year. They include a WILD coloring book for small children and for use in elementary classrooms, mugs for use by WILD teachers, and promotional tee-shirts. All have been well received and the income from the sale of these items, handled by the Massachusetts Audubon Society, has helped to underwrite the costs of the WILD Newsletter. To supplement these funds, which must be extended as the number of WILD workshop participants grows, the Coordinators launched a small fund-raising drive which met with much interest and some success.

In a move to coordinate with WILD programs in other states and to increase the efficiency of the Massachusetts program, the facilitators attended the National WILD Coordinators conference and made arrangements for a National WILD Steering Committee meeting to be held in Salem in October.

Special Programs and Events

Employees Conference Section personnel prepared an employees conference designed to familiarize staff with existing programs and with progress during the past year. Photo identification cards were provided to employees in the first stage of a three year program to offer cards to all staff members.

Fuertes Prints In August of 1987 final authorization was given for the Division to produce and sell a limited edition of prints of paintings by Louis Agassiz Fuertes with all income being divided between the Inland Fish and Wildlife Fund and the Massachusetts Nongame Fund. To establish this program, three prints were prepared, a marketing strategy and promotional materials were developed, sales procedures were established and a special low number drawing was held in December of 1987.

Wildlife Calendar Text was prepared, photographs selected, and a marketing strategy developed for a 1989 Wildlife calendar. This program was abandoned in June 1988 when it became apparent that printing funds would not be available. With approval of the Fisheries and Wildlife Board this material was donated to a cooperator who had donated graphic services to the project.

Tags 'n' Trout During calendar year 1987, 21 groups joined with the Division in sponsoring statewide Tags 'n' Trout programs through which 442 specially tagged fish were released as part of a program to highlight Massachusetts' outstanding fisheries.

Sportfishing Awards This program, which provides information on the location of trophy fish in Massachusetts, operates on a calendar year basis. During 1987, 711 pins were

The Sportfishing Awards Program encourages fishing for some of our less well known species such as channel catfish in the Connecticut River.



offered to anglers taking exceptional fish in 20 categories. A new affidavit form was developed and confirmation of fish identification was made easier by the requirement that every entry be accompanied by a photograph. Six new check stations joined the program and new state records were set for four species:

Northern Pike - 34 lb. Chas. Pucelli
White Catfish - 9 lb. 3 ozs Mike Payne
Tiger Muskie - 19 lb. 4 oz. Al Farland
Bullhead - 3 lb. 8 oz. Janet Bourgeois
(tied existing record)

Waterfowl Stamp Competition and Exhibit

Twenty five artists from all parts of the nation entered the 1987 waterfowl stamp competition. The contest, judged by a panel of artists and decoy experts, ended with the selection of Bob Piscatori's painting of a cork-bodied mallard drake carved by A. Elmer Crowell. Following the competition all entries in the program were placed on two week exhibit at the Peabody Museum, Salem which houses the Division's archives on this program and which is a partner in a joint project celebrating decoys in Massachusetts.

Richard Cronin Building

Dedication — Pursuant to a resolution passed by the legislature, the Division's Field Headquarters in Westborough has been named the Richard Cronin Building. To mark this occasion a special event was hosted in April of 1988 for representatives of environmental and sporting groups and members of the general public. Section staff coordinated the event at which visitors toured the facility and learned about Division programs in process.

Information & Education Staff

Ellie Horwitz, *Chief*
William Byrne Jr.
Dan McGuinness
Peter Mirick
John E. Swedberg

REALTY

William J. Minior
Chief, Wildlife Lands

A new half billion dollar bond issue was passed (Chapter 564 of 1987) granting the Division of Fisheries and Wildlife 30 million dollars for acquisition of lands along rivers and streams, land adjacent to existing wildlife areas and rare and endangered species habitat. Not less than 20% of these funds must be spent in the coastal zone. An additional 30 million are to be shared with MDC for acquisition of key parcels in the Quabbin, Ware and Wachusett watersheds. Unfortunately, funds did not materialize in Fiscal Year 88, but their announced advent precipitated considerable land acquisition activity.

Six consulting land agents were hired to assist District personnel in their acquisition efforts in spending remaining Chapter 723 MGL funds and targeting priority areas for the new bond money. Most of the 32 acquisitions in Fiscal Year 88 were handled through 723 funds, however, three gifts of land and a transfer were gratefully accepted. Acquisition efforts were primarily directed toward riparian corridors, including major rivers and cold water streams, and adjacent lands. A total of 2,989.3 acres were acquired bringing the total Division owned land to 55,540 acres or nearly 87 square miles.

The Western District benefited by the addition of 1,957.3 acres in nine separate acquisitions. Adjacent lands were added to the Hinsdale, Chalet, Stafford Hill and Hop Brook WMA's. Two new WMA's were created: the 196 acre Cummington area and the 200 acre

Tracy Pond Area. A 110 acre parcel of excellent wildlife habitat was acquired in Windsor which is the source of Westfield Brook, a valuable tributary of the Westfield River. New areas of stream bank protection were added on the Konkapot and Westfield Rivers. All areas acquired are important, however of special note are the 1,010 acre addition which more than doubles the size of the Chalet WMA; and the 36 acre gift from the Berkshire County Land Trust and Conservation Fund which added substantially to the Hinsdale WMA.

The Connecticut Valley District acquired six tracts with a combined acreage of 577.5. Two separate acquisitions comprising the Catamount WMA were purchased adjacent to Catamount State Forest. It is excellent bear, deer and turkey habitat. Two tracts in Montague help to protect considerable Connecticut River stream bank and add substantial habitat to the abutting Montague State Forest. The Swift River and Satan's Kingdom WMA's were enhanced through one additional acquisition per area, increasing the total amount of Fisheries and Wildlife land in the Connecticut Valley to over 3,700 acres.

The Central District acquired 308.5 acres through five new parcels. Additions were made to the Quaboag, High Ridge, Phillipston and Westboro WMA's. A gift of 150 acres along the Five Mile River in North Brookfield acquired through The Nature Conservancy provides an excellent

diversity of wildlife and wildlife habitat. The Five Mile River is a picturesque meandering stream seasonally stocked with trout by the Division. A transfer of 85 acres more or less from the Division of Capitol Planning and Operations has finally given the Massachusetts Division of Fisheries and Wildlife control of the Westboro Field Headquarters and increased the size of the Westboro WMA which now includes about 418 acres.

The Northeast Wildlife District land acquisition efforts were most successful on river corridors. Two acquisitions along the Nissitissit River have guaranteed continued public use of an important section of river through a residential part of Pepperell. A 16.13 acre purchase on The Squannacook River in Townsend contains nearly 1,750 feet of river frontage and connects directly with other publicly owned parts of the corridor. Individual acquisitions on The Sudbury River in Sudbury and on The Concord River in Billerica were cooperative efforts with DEM and municipalities to protect valuable open space slated for development. Each provides considerable river frontage and potential canoe access.

The Southeast Wildlife District land

acquisitions included five river corridor tracts and additions to two WMA's. Three valuable acquisitions help to protect the Quashnet River on its journey to Waquoit Bay, preventing development along a considerable stretch of the river. The Nature Conservancy assisted in acquiring a tract on the Mashpee River and an approximate 1/2 acre access point was purchased on the Nemasket River in Middleboro. Small inholdings were added to both the Crane and Rocky Gutter WMA's, increasing wildlife habitat and solidifying boundaries.

Cost Summary

WESTERN DISTRICT

Expended - \$ 738,250.00
Acreage - 1,957.30
Cost per acre - 377.18

VALLEY DISTRICT

Expended - \$ 280,300.00
Acreage - 577.55
Cost per acre - 485.33

CENTRAL DISTRICT

Expended - \$ 47,100.00
Acreage - 308.50
Cost per acre - 152.67

NORTHEAST DISTRICT

Expended - \$ 676,020.00
Acreage - 110.93
Cost per acre - 6,094.11

SOUTHEAST DISTRICT

Expended - \$ 1,463,479.72
Acreage - 35.06
Cost per acre - 41,742.15

TOTAL EXPENDED; \$3,204,149.72
TOTAL ACREAGE ACQUIRED;
2,989.34
AVERAGE COST PER ACRE; 1,072.19

Purchase of wetland habitat continues to be a priority for the Realty Section.



DISTRICT REPORTS

Northeast District, Walter Hoyt, *Manager*
Southeast District, Louis Hambly, *Manager*
Central District, Chris Thurlow, *Manager*
Conn. Valley District, Herman Covey, *Manager*
Western District, Tom Keefe, *Manager*

The five wildlife districts form the field presence of the Division of Fisheries and Wildlife administering wildlife lands, conducting on-site management activities and dealing with fish and wildlife issues pertinent to their region.

Staff from the districts implement fisheries and wildlife research projects, conduct trout and pheasant release programs, operate deer, bear, turkey and furbearer checking stations, and serve as liaison with sporting and conservation groups in their areas. All districts distribute licenses, abstracts and other materials related to hunting/fishing license sales and assist officers from the Division of Environmental Law Enforcement in ensuring public adherence to wildlife laws and regulations.

During this past year District staff participated in a wide variety of research projects including the mid-winter eagle survey, waterfowl inventory and banding, census of mourning doves, woodcock, quail, and survey of great blue heron rookeries. They also monitored the pH levels of lakes and streams prior to stocking trout in those waters, reviewed the Environmental Monitor for development projects that affect wetland areas and provided advice on the control of environmental problems. One recurring item is the issue of control of nuisance animals. Perhaps the highlight of the year for most

districts was the identification and acquisition of wildlife lands under the Division's expanded realty program.

District personnel also participated in certain projects implemented only or primarily in their particular region.

Staff of the Northeast District were heavily involved with cooperative agreements with farmers, with the release of wild turkeys in Boxford and Groton and with the release of Northern Pike into the Charles River, the Concord River and Whitehall Reservoir.

Southeast District staff constructed a storage building complete with lofts and storage platforms. They continued work on the Walleye project, tagging 75 adult walleyes. They took eggs from these fish, and from them 2000 fry were reared and stocked into Great Herring Pond. Quail census is particular to the southeastern district, as is the monitoring and maintenance of osprey nesting platforms.

Central District crews were heavily involved in the eagle restoration project. They also gathered data on landlocked salmon at Wachusett Reservoir and on landlocked alewives at South Pond.

Staff of the Connecticut Valley District initiated a brown trout study examining the forage value of smelt and alewives.

This district was also involved with the Swift River Improvement Project conducted by district personnel and volunteers from a wide variety of fishing groups. Conn. Valley staff also provided assistance to the eagle restoration project by providing food for the young eagles.

Western District staff participated in the live trapping of wild turkeys for release in more easterly areas. They also conducted a special deer hunt for paraplegic sportsmen.

District Staff

Northeast Wildlife District

Walter L. Hoyt Jr, *Manager*
Tom Sheehan, *Game Manager*
Peter Jackson, *Fisheries Manager*
David Ford
Russell Garland
Lawrence Howie
Howard Kreiser
Francis O'Meara

Southeast Wildlife District

Louis S. Hambly, *Manager*
Richard Turner, *Game Manager*
John Dixon, *Fisheries Manager*
Barbara Brockman
Joseph Comick
Edward Kraus
Peter Nelson
Richard Norton

Central Wildlife District

Chris Thurlow, *Manager*
Mike Ciborowski, *Game Manager*
Lee McLaughlin, *Fisheries Manager*
David Carlson
Cheyney Dodge
Paul LeBoeuf
Arthur Myers
Paul Orrizzi
Paul Ostrowski
Robert Thomasian

Conn. Valley Wildlife District

Herman Covey, *Manager*
Peter Pekkala, *Game Manager*
Philip Brenner, *Fisheries Manager*
John Boudreau
Michael Dumont
Andrew Foley, Jr.
Gary Galas
John Nowakowski, Jr.
Nelson Pratt
Martin Wrubel

Western Wildlife District

Thomas Keefe, *Manager*
Anthony Gola, *Game Manager*
Leo Daly, *Fisheries Manager*
Ed Hover

Joseph Kirvin
Jerry Shampang
David St. James

MAINTENANCE AND DEVELOPMENT

Stephen M. Henry
Senior Planner

Hatcheries and Game Farms

McLaughlin State Fish Hatchery's gravel packed well was rejuvenated, and underground fuel storage tanks at the hatchery passed their tests for tightness. East Sandwich State Fish Hatchery has had a history of poor water quality. To alleviate this situation, two test wells were driven to locate a better source of water. A much improved source was located at approximately 65 feet. The Roger Reed State Fish Hatchery's office/hatch house has been re-shingled as was the larger brooder house located at the Ayer State Game Farm.

Installations and Residences

Mitigation of the gas tank leak at Southeast Wildlife District office continues. Additional groundwater testing has been completed. Division personnel have met with D.E.Q.E.

regarding the necessary remedial actions needed to remove the contamination from the soil and groundwater. Much of this remedial work will take place during FY '89 and '90. D.E.Q.E. notified the Division of hazardous material located at the Petersen Farm in West Bridgewater, where open bags of arsenic of lead lay exposed to the elements. All contaminated material has been placed in special containers for disposal. The Richard Cronin Field Headquarters has been spruced up as students from Assabet Valley Regional Vocational School painted the interior of the building.

A new boiler was installed at the Western District residence. The

Planning and Maintenance Staff

Stephen Henry, *Chief*
Raymond Wheeler

FEDERAL AID PROGRAM

R. Stewart McCaig
Coordinator

During FY '88 the Federal Aid Coordinator continued to expedite flow of federal funds into Division projects. On July 1, 1987, the status of these funds encumbered in active projects was \$1,525,020 under the Pittman-Robertson Program, \$1,327,975 (shared by Division of Marine Fisheries and Division of Fisheries and Wildlife) under the Dingell-Johnson program, and \$18,400 under the Endangered Species Program for a total \$2,871,395 actively in use to fund state/federal projects as of the beginning of the fiscal year. In March, 1988, the U.S. Department of the Interior made a final determination of moneys available to the states from excise tax revenues collected during the year which ended September 30, 1987 under the Sport Fish and Wildlife Restoration Acts and notified Massachusetts of entitlement to the following shares:

Pittman-Robertson -	
Wildlife Restoration	464,500
Hunter Education	<u>510,000</u>
Total	974,500

Dingell-Johnson -	<u>1,557,000</u>
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Grand Total	\$2,531,500
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Following provisions of the 1984 Wallop-Breaux amendment, apportionments for sport fish restoration must be shared "equitably" by the Division of Marine Fisheries and Division of Fisheries and Wildlife. The 1988 Endangered Species apportionment, applicable almost entirely to work with the Plymouth red-bellied turtle and the piping plover, was \$20,400.

Compliance with federal non-discrimination became an issue during 1987, and Fish and Wildlife Service Region 5 office, administering state finances under the Acts, reiterated state responsibilities to comply with Title VI, Civil Rights Act of 1964 and Section 504, Rehabilitation Act of 1973. Director Cronin designated the Federal Aid Coordinator to serve as liaison with the Region 5 office to implement these Acts. Non-discrimination legislation also received serious attention at the annual Coordinators Conference, held at Lake Placid, New York, in August 1987, and the subject continued to make demands on the Coordinator's time throughout the remainder of the fiscal year.

In November of 1987, the Coordinator submitted results of a test, based on examination of 1985 license stubs, verifying that the number of paid Massachusetts license holders included no duplications; in the spring of 1988, he submitted certification of 96,695 paid hunting licenses and 204,923 fishing licenses. In February, he completed final resolution of requirements from the Region 5 Program Analyst, based on a 1986 audit of Division fiscal years 1981-85.



THE HISTORY OF THE

REIGN OF

THE GREAT KING
OF GREAT BRITAIN
AND OF THE
IRISH EMPIRE
BY
SAMUEL JOHNSON
ESQ.
OF LONDON
IN TWO VOLUMES
THE FIRST
LONDON
PRINTED BY A. MILLAR, IN ST. PAULS CHURCH-YARD
MDCCLXXIII



LEGISLATION

ACTS OF 1988

Chapter 6 - An Act Designating the Field Headquarters of the Division of Fisheries and Wildlife at the Lyman School for Boys in the Town of Westboro as the Richard Cronin Building.

Chapter 294 - An Act Establishing a Procedure for the Disposal of Certain Killed Deer.

This legislation amended Ch. 131, Sect. 72 to change the requirements relative to the display of a deer carcass and added a provision on the disposal of vehicle killed deer. Under this change the carcass only has to be visible from the point of taking to the check station and not at all times as previously required under Sect.72. In addition, Mass. residents may now retain a deer carcass that was killed as a result of a collision with their vehicle.

PERSONNEL REPORT

NEW HIRES

Richard Cannata Laborer, 8/27/87
Mary Cavaliere, Bookkeeper I, 8/27/87
Peter Burns, Asst. Fish Culturist, 8/27/87
Ann Lee, Confidential Secretary, 9/24/87
Juliette Santos, Clerk IV, 9/24/87
Dan McGuiness, Information Officer II, 10/26/87
Alberto Ortiz, Skilled Laborer, 10/26/87
Charles Harris, Laborer, 10/26/87
Robert Janak, Skilled Laborer, 10/26/87
Jack Buckley, Deputy Director/Admin., 11/24/87
Dale Beals, Laborer, 11/24/87
Lawrence Sacazawa, Laborer, 11/24/87
John Sheedy, Asst. Game Culturist, 11/24/87
Lillian Hew, Bookkeeper II, 1/21/88
David Yankus, Laborer, 2/22/88
Susan Langlois, Fish & Game Mgt. Specialist, 3/31/88
Carl Lui, Bookkeeper I, 5/26/88
Yunus Kahlifa, Bookkeeper I, 5/26/88
James Polk, Laborer, 5/26/88

RETIREMENTS

Six staff members retired taking with them 194 years of experience!
They are:

Lewis Schlotterbeck, Deputy Director/Admin., 11/24/87	34 years
Edward Bolduc, Skilled Laborer, 11/24/87	18 years
Lloyd Raymond, Fish Culturist, 12/10/87	40 years
William Pollack, Game Biologist III, 12/31/87	37 years
John Swedberg, Audio Visual Equip. Supervisor, 4/23/88	15 years
John Prouty, Fish Culturist, 8/21/88	50 years

RESIGNATIONS

Robert Tomasian, Skilled Laborer, 8/11/87
Robert Gallagher, Laborer, 8/27/87
Suzanne Timmerman, Bookkeeper I, 8/27/87
Nelson Pratt, Laborer, 8/27/87
Linda Baumgardner, Confidential Secretary, 9/24/87
Marcia Plourde, Accountant I, 11/20/87
Charles Harris, Laborer, 11/20/87
Stephanie Shea, Fish & Game Mgt. Specialist, 2/22/88
David Yankus, Laborer, 5/26/88

PROMOTIONS

Chester Kopinto to Skilled Laborer, 8/27/87
Peter Mirick, to Information Officer II, 10/26/87
Stephanie Shea to Fish & Game Mgt. Specialist, 11/24/87
William Davis to Wildlife Tech. II, 11/24/87
William Minor to Chief of Wildlife Lands, 12/10/87
John Sheedy to Asst. Game Culturist, 1/21/88
Alan Aittaniemi to Fish Culturist, 1/21/88
Eleanor Horwitz to Information Officer III, 1/21/88

TERMINATION

Peter Nelson, Laborer, 5/30/88

TRANSFERS TO STATE POSITIONS

Henry Woolsey, Env. Analyst III, 1/1/88
Scott Melvin, Game Biologist II, 1/1/88
Bruce Sorrie, Env. Analyst I, 1/1/88
Patricia Swain, Env. Analyst I, 1/1/88
Jay Copeland, Planning Assistant, 3/27/88

Financial Staff

Nancy Melito
Assistant Director, Fiscal Affairs

Joanien Brazo*
Mary Cavalieri
Lillian Hew
Francis Ibilli*
Yunus Khalifa
Nancy Limosani
Carl Lui
Marcia Plourde*
Mary Lou Raples
Elizabeth Sienczyk
Ruthann Surrette
Suzanne Timmerman*

*Terminated during Fiscal Year 88

HOW THE SPORTSMEN'S DOLLAR WAS SPENT

CATEGORY	EXPENDITURE	PERCENTAGE
ADMINISTRATION		
Administration	621,348	
Information & Education	305,269	
Subtotal	926,617	12.35
WILDLIFE PROGRAMS		
Game Farm	398,918	
Wildlife Mgt.	911,571	
Wild. Coop.Unit	72,000	
Subtotal	1,373,489	18.30
FISHERIES PROGRAMS		
Hatcheries	975,948	
Fisheries Mgt	831,632	
Fish. Coop.Unit	100,000	
Subtotal	1,907,580	25.43
CONSTRUCTION AT FACILITIES	80,602	1.07
LAND ACQUISITION	101,910	1.36
EQUIPMENT	90,949	1.21
MAGAZINE	84,093	1.12
TRANSFERS TO OTHER ACCOUNTS		
Hunter Safety (Div. Law Enforc't)	179,480	
Shellfish Purification (Div. M. Fish.)*	36,604	
Subtotal	216,084	2.88
SPLIT FUND ACCOUNT		
Nat. Heritage	66,507	
Law Enforcement	971,914	
EOEA	85,775	
Subtotal	1,124,196	14.98
OTHER ASSESSMENTS		
Retirement (.2%)	491,146	
Interest on Debt	50,000	
Notes & Bonds	9,199	
Subtotal	550,345	7.34
TRANSFERS FROM FUND		
Group Ins.	313,416	
Fringe Benefits	242,348	
Subtotal	555,764	7.41
FY 87 Cross Year Transactions	363,000	4.84
Encumbrance Reserve	128,083	1.71
TOTAL EXPENDITURES	7,502,712	100

* Revenues & expenditures in this account were inadvertently included in the Inland Fish and Game Fund by the State Comptroller.

APPROPRIATION AND EXPENDITURES

INLAND FISH AND GAME FUND
July 1, 1987 to June 30, 1988

APPROPRIATIONS:

Activity	Appropriation	Encumbered	Expenditure	Reversion
Administration	972,265	25,039	926,617	20,609
Land Acquisition	421,145	205,728	101,910	113,507
Equipment	200,000	88,970	90,949	20,081
Management.	3,623,672	255,614	3,281,069	86,989
Total	5,217,082	575,351	4,400,545	241,186

CONTINUING APPROPRIATIONS:

Activity	Appropriation	Encumbered	Expenditure	Bal. Forward
Development	130,841	25,358	80,602	24,881

RETAINED REVENUE:

Activity	Appropriation	Encumbered	Expenditure	Bal. Forward
Magazine	209,524	32,897	84,093	92,552

FUND SPLIT:

Activity	Appropriation	Encumbered	Expenditure	Reversion
NHESP*	70,500		66,507	3,993

GENERAL FUND:

Activity	Appropriation	Encumbered	Expenditure	Reversion
Acid Rain Pro.	355,920	21,399	116,545	3,056
Acid Rain Res.	709	0	0	709
Total	356,629	21,399	116,545	3,765

CAPITAL OUTLAY:

Activity	Appropriation	Expenditure	Bal. Forward
Building Demolition	15,000	0	15,000
Hatchery Reconstruction	429,000	36,307	383,693
Fuel Tank Removal(Statewide)	79,000	0	79,000
Land Acquisition(Cold wtr.str)	3,526,452	1,392,500	2,133,952
Associated Costs(8840)	221,146	36,688	184,458
Land Acquisition(Adj. Lands)	5,526,273	672,278	4,853,995
Associated Costs(8842)	407,304	117,325	289,978
Fuel Tank Removal(Bourne)	187,225	46,392	140,833
Toxic Substances Removal	13,000	0	13,000
Photovoltaic Project	14,390	0	14,390
Total	10,418,790	2,301,490	8,108,299

FEDERAL GRANTS:

Activity	Appropriation	Expenditure	Bal. Forward
Whetstone Brook Project	116,321	116,321	0

NONGAME WILDLIFE FUND ACCOUNTS:

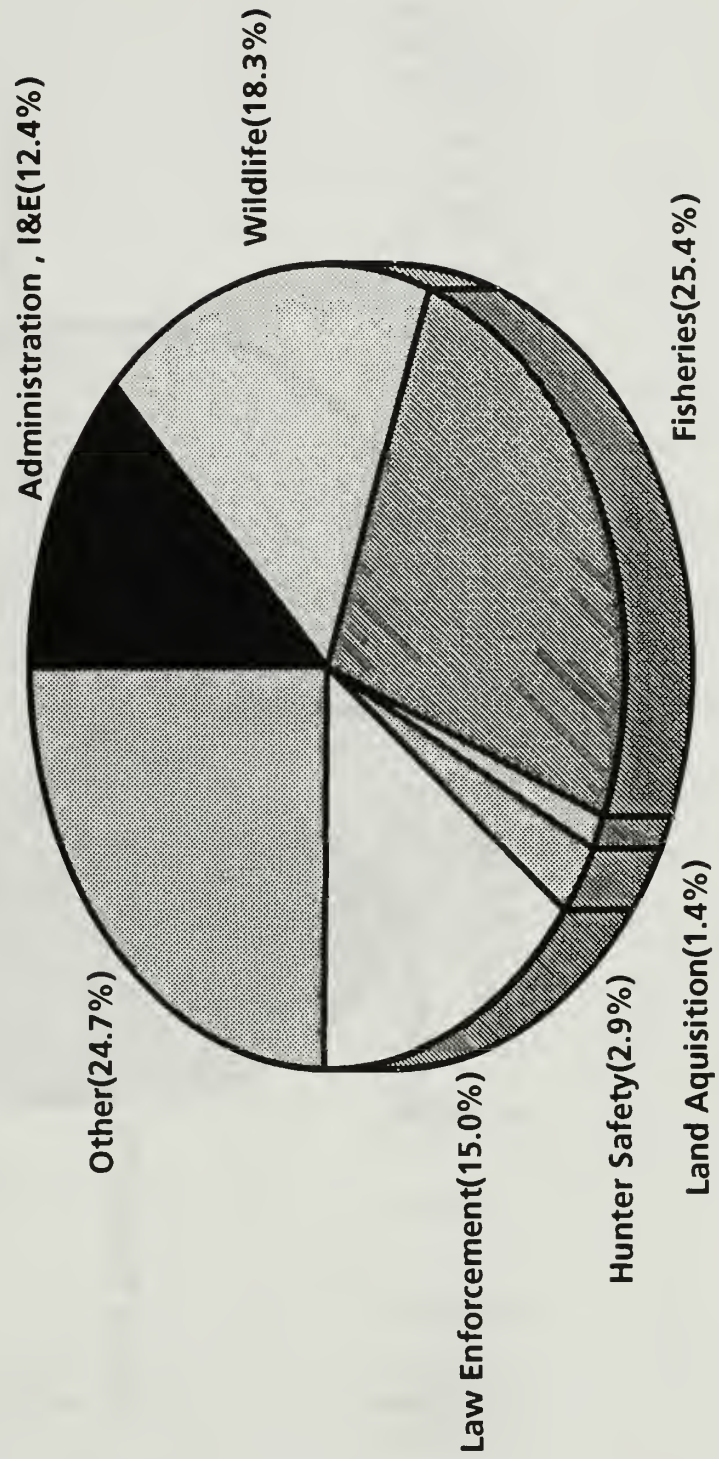
Activity	Appropriation	Expenditure	Reversion
Administration	361,627	273,366	88,261
NHESP*	70,127	66,507	3,993
Total	431,754	339,873	92,254

TRUST FUND ACCOUNTS:

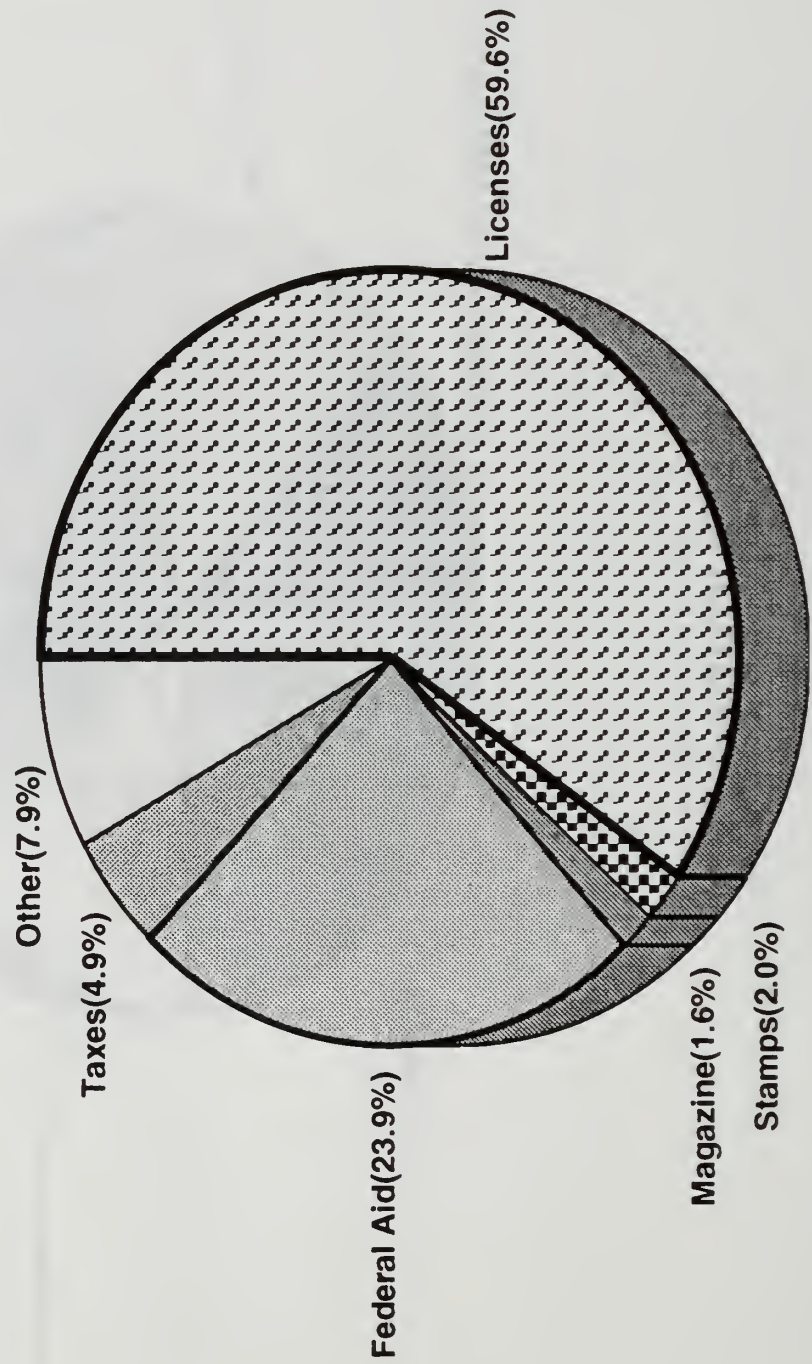
Activity	Appropriation	Expenditure	Reversion
Bald Eagle II	358	330	28
Bald Eagle III	2,000	924	1,076
Total	2,358	1,254	1,104

* 50% Inland Fish and Game Fund
50% Nongame Wildlife Fund

Expenditures



Income



SUMMARY
REVENUE, OTHER FINANCING SOURCES, REVERSIONS
INLAND FISH AND GAME FUND
 July 1, 1987 to June 30, 1988

COLLECTED BY AGENCY	AMOUNT
Fishing, Hunting & Trapping Licenses	4,897,568.80
Archery Stamps	129,090.60
Trap Registration	1,444.00
Waterfowl Stamps	19,462.25
Waterfowl Stamps/DU	21,644.20
Special Licenses, Tags & Posters	16,306.00
Antlerless Deer Permits	49,651.00
Bear Permits	5,162.00
Turkey Permits	44,589.00
Rents	36,262.38
Sales, Other	39,891.70
Misc. Income	4,928.04
Magazine Subscript.	136,559.80
Shellfish Purification*	83,446.50
Fuertes Prints	11,287.50
Subtotal	5,497,293.77
COLLECTED BY STATE TREASURER	
Fines and Penalties	46,994.55
Interest	1,232.00
Subtotal	48,226.55
FEDERAL AID	
Pittman-Robertson	887,520.87
Dingell-Johnson	651,419.71
Anadromous Fish	605.87
Endangered Species	7,221.76
Indirect Cost Reimbursement	456,993.56
Subtotal	2,003,761.77
TAXES	
Gasoline Tax	411,000.00
TOTAL REVENUE:	7,960,282.09
TRANSFERS FROM GENERAL FUND	
Reimbursement/Half Price Licenses	61,000.00
REVERSIONS	
Accounts Payable	970,000.00
TOTAL OTHER FINANCIAL SOURCES	1,031,000.00
TOTAL REVENUE AND OTHER SOURCES	8,991,282.09
FUND EQUITY AS OF JUNE 30, 1988	2,638,000.00

**SUMMARY OF LICENSE SALES
FY 1988**

TYPE LICENSE	UNIT PRICE	QUANTITY	AMOUNT
Res. Cit. Fishing	\$ 12.50	201,808	2,522,600.00
Res. Cit. Minor Fish	\$ 6.50	9,781	63,576.50
Res. Cit. Fish (65-69)	\$ 6.25	7,835	48,968.75
Res. Cit. Fish (Blind-Para)	FREE	3,739	N/A
Res. Alien Fishing	\$ 14.50	2,204	31,958.00
Non-Res Cit/Alien Fishing	\$ 17.50	10,716	187,530.00
Non-Res Cit/Alien Fish (7 day)	\$ 11.50	3,205	36,857.50
Res. Cit. Trapping	\$ 20.50	681	13,960.50
Res. Cit. Trap Minor	\$ 8.50	53	450.50
Res.Cit. Trappin (65-69)	\$ 10.25	45	461.25
Non-Res Trapping	\$ 300.00	3	900.00
Duplicate Fishing	\$ 2.00	1,575	3,150.00
Duplicate Trapping	\$ 2.00	16	32.00
Res. Cit. Hunting	\$ 12.50	41,551	519,387.50
Res. Cit. Hunting (65-69)	\$ 6.25	630	3,937.50
Res. Cit. Hunting (Para)	FREE	205	N/A
Res. Alien Hunting	\$ 19.50	1,088	21,216.00
Non-Res.Cit./Alien Big Game	\$ 48.50	1,603	77,745.50
Non-Res.Cit./Alien Sm. Game	\$ 23.50	1,395	32,782.50
Non-Res.Cit./Alien Comm. Sh. Pres. (3 day)	\$ 19.50	372	7,254.00
Res. Cit. Sporting	\$ 19.50	72,077	1,405,501.50
Res. Cit.Sporting (65-69)	\$ 9.75	3,403	33,179.25
Res.Cit. Sporting (Over 70)	FREE	23,827	N/A
Duplicate Hunting	\$ 2.00	524	1,048.00
Duplicate Sporting	\$ 2.00	1,971	3,942.00
TOTAL LICENSE SALES		390,307.00	\$5,016,438.75
Archery/Primitive Firearms Stamp	\$ 5.10	25,306	129,060.60
Waterfowl Stamp	\$ 1.25	24,654	30,817.50
Sales to Collectors (A/P stamps)			30.00
Sales to Collectors (W stamps)			14,192.50
TOTAL STAMP SALES			174,100.60
Collection of Bad Debts			555.75
Trap Registration*			1,444.00
Fees Retained by Clerks			(119,455.70)
Fees Retained by Clerks			(3903.55)
TOTAL NET LICENSE & STAMP SALES			5,069,179.85

* Initial: 94 @ \$4 \$ 376.00

Renewals: 356 @ \$3 \$1,068.00 Total: \$ 1,444.00

SPECIAL LICENSES, TAGS AND POSTERS

July 1,1987 to June 30,1988

Type of License	Quantity	Unit Price	Amount
FUR BUYERS			
Resident	18	25	450.00
Non-Resident	7	75	525.00
TAXIDERMIST	104	20	2,080.00
PROPAGATORS			
Special	56	1	56.00
Class 1			
Initial 21	15	315.00	
Renewal	124	10	1,240.00
Class 3			
Initial 24	15	360.00	
Renewal	100	10	1,000.00
Class 4			
Initial 23	15	345.00	
Renewal	334	10	3,340.00
Class 6			
Initial 11	15	165.00	
Renewal	25	10	250.00
Add. Stores	220	5	1,100.00
Class 7			
Initial 2	5	10.00	
Renewal	19	2	38.00
Importation Permits			
Fish 7	7.5	52.50	
Birds 109	7.5	817.50	
Class 9			
Masters	7	25	175.00
Apprentices	12	25	300.00
General	17	25	425.00
Class 10			
Raptor Breeding	6	10	60.00
Class 11			
Raptor Salvage	27	1	27.00
SHINERS	76	10	760.0
FIELD TRIAL	34	15	510.00
EELS	5	25	125.00
QUAIL FOR DOG TRAINING			
Initial 5	7.5	37.50	
Renewal	11	5	55.00
SHOOTING PRESERVE	7	50	350.00
MOUNTING PERMIT	4	2	8.00
SPEC.FIELD TRIAL PERMIT	8	15	120.00
TAGS & POSTERS			
Game Tags	6,935	.10	693.50
Fish Tags	10,320	.05	516.00
TOTAL			16,306.00

No.	Name	Sex	Age	Height	Weight	Chest	Arm	Forearm	Hand	Foot	Length	Breadth	Depth	Index	Middle	Ring	Little	Thumb	Index	Middle	Ring	Little	Thumb	Index	Middle	Ring	Little	Thumb		
1	John Smith	M	25	5' 8"	160	34	22	18	10	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	Mary Jones	F	30	5' 4"	120	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
3	Robert Brown	M	20	5' 6"	140	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
4	Elizabeth White	F	28	5' 2"	110	31	19	15	7	7	8	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
5	William Black	M	35	5' 10"	170	35	23	19	11	11	11	5	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
6	Anna Green	F	22	5' 3"	115	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
7	Thomas Grey	M	27	5' 7"	150	34	22	18	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
8	Sarah Hall	F	32	5' 5"	125	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
9	James King	M	24	5' 9"	165	34	22	18	10	10	11	5	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
10	Charlotte Lee	F	29	5' 4"	120	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
11	George Clark	M	31	5' 11"	175	36	24	20	12	12	12	6	5	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
12	Frances Adams	F	26	5' 3"	118	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
13	Richard Scott	M	23	5' 7"	145	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
14	Emily Wilson	F	33	5' 5"	122	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
15	Henry Taylor	M	21	5' 6"	142	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
16	Isabella Young	F	27	5' 4"	119	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
17	Charles Evans	M	34	5' 10"	172	35	23	19	11	11	11	5	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
18	Martha King	F	25	5' 3"	116	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
19	Edward Hall	M	28	5' 8"	155	34	22	18	10	10	11	5	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
20	Lucy Green	F	30	5' 5"	121	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
21	Frederick Black	M	26	5' 7"	148	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
22	Harriet White	F	29	5' 4"	120	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
23	Albert Brown	M	32	5' 11"	174	36	24	20	12	12	12	6	5	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
24	Elizabeth Adams	F	24	5' 3"	117	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
25	William Scott	M	29	5' 8"	158	35	23	19	11	11	11	5	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
26	Ann King	F	31	5' 5"	123	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
27	George Hall	M	23	5' 6"	143	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
28	Charlotte Green	F	27	5' 4"	119	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
29	Thomas Black	M	33	5' 10"	173	36	24	20	12	12	12	6	5	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
30	Mary White	F	25	5' 3"	116	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
31	Robert Brown	M	28	5' 7"	152	34	22	18	10	10	11	5	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
32	Elizabeth Adams	F	30	5' 5"	121	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
33	James Scott	M	24	5' 6"	144	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
34	Frances King	F	26	5' 4"	118	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
35	Charles Hall	M	31	5' 9"	160	35	23	19	11	11	11	5	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
36	Ann Green	F	29	5' 5"	122	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
37	George Black	M	25	5' 7"	146	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
38	Harriet White	F	28	5' 4"	120	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
39	Albert Brown	M	32	5' 11"	174	36	24	20	12	12	12	6	5	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
40	Elizabeth Adams	F	24	5' 3"	117	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
41	William Scott	M	29	5' 8"	158	35	23	19	11	11	11	5	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
42	Ann King	F	31	5' 5"	123	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
43	George Hall	M	23	5' 6"	143	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
44	Charlotte Green	F	27	5' 4"	119	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
45	Thomas Black	M	33	5' 10"	173	36	24	20	12	12	12	6	5	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
46	Mary White	F	25	5' 3"	116	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
47	Robert Brown	M	28	5' 7"	152	34	22	18	10	10	11	5	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
48	Elizabeth Adams	F	30	5' 5"	121	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
49	James Scott	M	24	5' 6"	144	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
50	Frances King	F	26	5' 4"	118	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
51	Charles Hall	M	31	5' 9"	160	35	23	19	11	11	11	5	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
52	Ann Green	F	29	5' 5"	122	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
53	George Black	M	25	5' 7"	146	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
54	Harriet White	F	28	5' 4"	120	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
55	Albert Brown	M	32	5' 11"	174	36	24	20	12	12	12	6	5	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
56	Elizabeth Adams	F	24	5' 3"	117	32	20	16	8	8	9	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
57	William Scott	M	29	5' 8"	158	35	23	19	11	11	11	5	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
58	Ann King	F	31	5' 5"	123	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
59	George Hall	M	23	5' 6"	143	33	21	17	9	9	10	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
60	Charlotte Green	F	27	5' 4"	11																									